

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Rec'd PCT/PTO 20 JAN 2005


Applicant's or agent's file reference 2002257	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/ES 02/00369	International filing date (day/month/year) 24.07.2002	Priority date (day/month/year) 24.07.2002
International Patent Classification (IPC) or both national classification and IPC F02M31/13		
Applicant NAGARES S.A. et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 4 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

- This report contains indications relating to the following items:

- |      |                                     |  |
|------|-------------------------------------|--|
| I    | <input checked="" type="checkbox"/> | Basis of the opinion   |
| II   | <input type="checkbox"/>            | Priority   |
| III  | <input type="checkbox"/>            | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| IV   | <input type="checkbox"/>            | Lack of unity of invention   |
| V    | <input checked="" type="checkbox"/> | Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| VI   | <input type="checkbox"/>            | Certain documents cited  |
| VII  | <input type="checkbox"/>            | Certain defects in the international application   |
| VIII | <input type="checkbox"/>            | Certain observations on the international application  |

Date of submission of the demand  05.02.2003	Date of completion of this report  24.08.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Dorfstätter, M  Telephone No. +49 89 2399-8133



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/ES 02/00369

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-9 as published

**Claims, Numbers**

1-3 received on 11.08.2004 with letter of 10.08.2004

**Drawings, Sheets**

1/2-2/2 as published

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/ES 02/00369**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-3
	No: Claims	
Inventive step (IS)	Yes: Claims	1-3
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-3
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: DE 199 54 690 A

D3: JP 60 116 849 A

The document **D3** is regarded the most relevant prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document) a heating system for heating the intake air of an internal combustion engine. As heating element an electric heater is used.

The document **D1** is also regarded relevant prior art to the subject-matter of claim 1, and shows a Peltier-element - that can be regarded a thermocouple - as a heater for intake air.

The subject-matter of claim 1 differs from this known system in that as heating element a wire is used that consists of two segments made from different metal alloys. The joint of the two segments is placed in the centre of the intake duct. Thereby, the heating element can alternately be used as a thermocouple for measurement of air intake flow.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to use the heating element both for heating and determining the air flow characteristics.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) since none of the available prior art documents suggests to provide a heating element consisting of a heating wire made from two segments of different metal alloys, whereby their joint is located in the centre of the intake duct.

Claims 2 and 3 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

CLAIMS

5 1. System for controlling the temperature of the intake air in internal  
combustion Diesel engines, applicable as a means for heating the intake air  
introduced in automotive engines, as well as for controlling the temperature of this  
airflow, and even for knowing the flow rate of this intake airflow, characterised in  
that the heating means consist of a resistor having two segments (1) and (1')  
made of different metal alloys, joined on one of their ends (2) to form a  
10 thermocouple that together with a control circuit determine a module which, when  
placed at each intake inlet (4), allow heating and controlling the temperature of the  
intake air up to a limit at which the temperature is maintained constant and is  
independent of the ambient temperature, the union (2) of the segments (1-1') that  
determined the resistor being preferably located in correspondence with the point  
15 where the intake airflow is greatest.

2. System for controlling the temperature of the intake air in internal  
combustion Diesel engines, according to claim 1, characterised in that the control  
circuit connected to the terminals (8-8') of the resistor formed by the segments (1)  
20 and (1') is comprised of: two control signals CDE and T\_ref, which are the power  
activation signal and the signal indicating the working temperature respectively;  
outputs Vp and T informing of the voltage at the resistor terminals (8-8') and the  
temperature of the resistor respectively, with their corresponding amplification and  
conditioning circuits (9 and 12); and finally a comparator (11) with which the  
25 energy supply to the resistance is ordered when the power activation signal (CDE)  
is activated.

3. System for controlling the temperature of the intake air in internal  
combustion Diesel engines, according to previous claims, characterised in that the  
30 control circuit is connected to an electronic control unit (13) of the corresponding  
engine, with an interposed interface (14) that can be either analogue or digital.